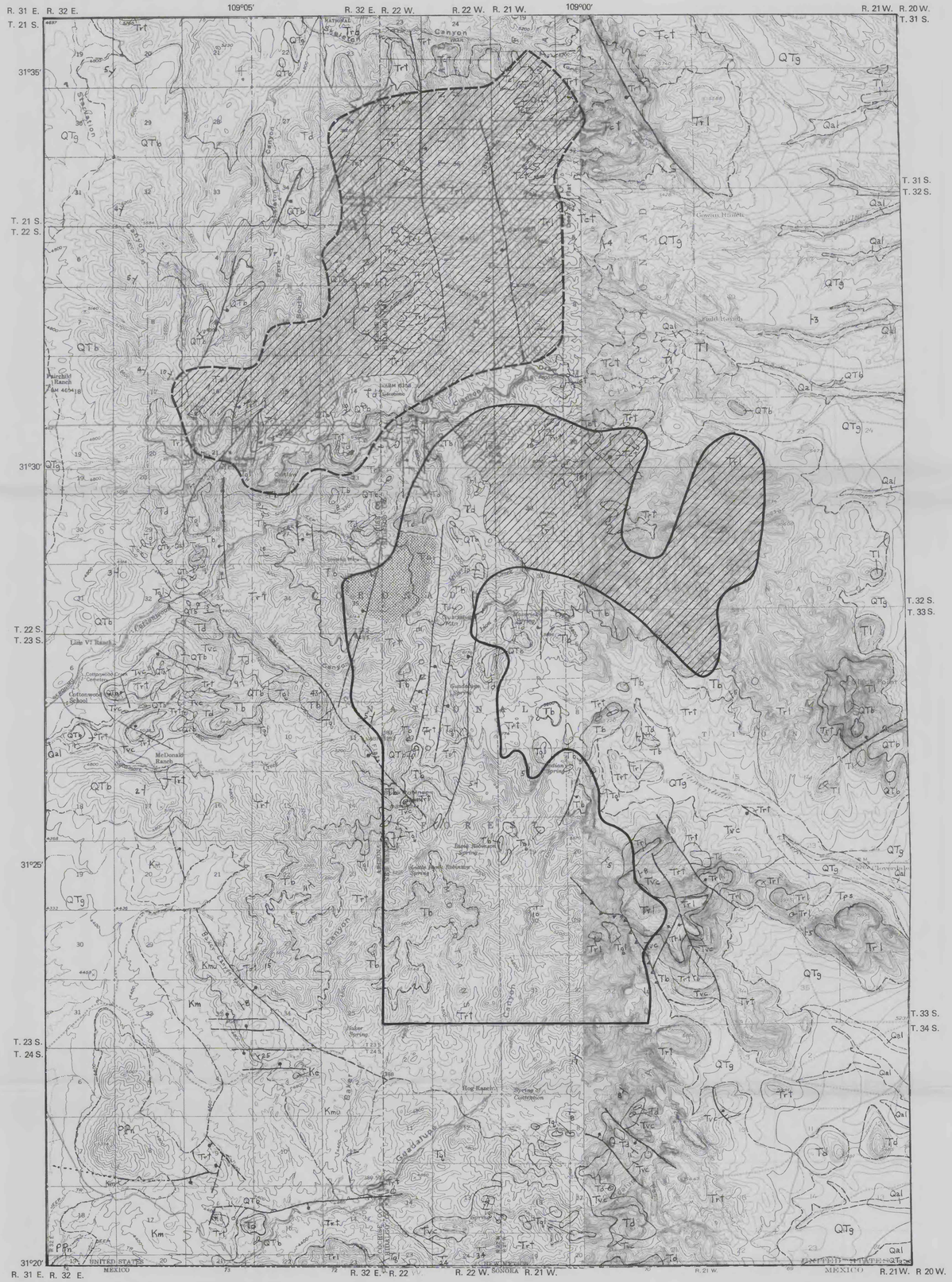
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY



Base from U.S. Geological Survey, 1:62,500
Apache, Guadalupe Canyon, 1958;
Animas Peak, Cienega Springs, 1918

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES
1 .5 0 1 2 3 4 KILOMETERS

Geology modified primarily from Erb (1979), Cooper (1957), and Wrucke and Bromfield (1961); modifications by P. T. Hayes in 1980

MINERAL RESOURCE POTENTIAL MAP OF BUNK ROBINSON PEAK AND WHITMIRE CANYON ROADLESS AREAS, HIDALGO COUNTY, NEW MEXICO AND COCHISE COUNTY, ARIZONA

By

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CORRELATION OF MAP UNITS

Qal	Holocene	QUATERNARY
UNCONFORMITY		
QTg, QTb	Pleistocene, Pliocene	QUATERNARY
UNCONFORMITY		
Tl	Miocene	TERTIARY
Tct	Miocene(?)	TERTIARY
Try, Trl		TERTIARY
Tps, Tvc, Tb, Tql, Td	Oligocene	TERTIARY
Trt, Tro		TERTIARY
UNCONFORMITY		
Kc, Kmu, Km	Lower Cretaceous	CRETACEOUS
UNCONFORMITY		
PIPn		PERMIAN AND PENNSYLVANIAN

DESCRIPTION OF MAP UNITS

Qal ALLUVIUM (HOLOCENE)--Poorly sorted sand, silt, and clay containing some pebbles, cobbles, and boulders. Mapped only in flood plains of drainages. Less than 100 ft thick

QTg FAN GRAVELS (HOLOCENE, PLEISTOCENE, AND PLIOCENE)--Loosely consolidated, poorly sorted pebble and cobble gravel, sand, silt, and clay deposited adjacent to Peloncillo Mountains. Thickness unknown

QTb OLIVINE BASALT LAVA (PLEISTOCENE OR PLIOCENE)--Porphyritic olivine basaltic lava. Interlayered with fan gravels (QTg) in Clanton Draw; underlies those gravels elsewhere. More than 1,000 ft thick west of Whitmire Canyon Roadless Area, but less than 100 ft thick within the roadless areas

Tl LATITIC LAVA (MIOCENE)--Latitic lava domes and flows with abundant, large phenocrysts of anorthoclase and clinopyroxene. Zircon fission-track age 22.3±1.2 m.y. old (Erb, 1979). About 400 ft thick around Black Point

Tct SANDSTONE, CONGLOMERATE, AND TUFF (MIOCENE?)--Tuffaceous sandstone and conglomerate with interbeds of waterlaid tuff; includes a 33- to 66-ft-thick ash-flow tuff unit in upper Skeleton Canyon area. Nearly 500 ft thick

Try YOUNGER RHYOLITIC ASH-FLOW TUFF (OLIGOCENE)--Crystal-poor rhyolitic ash-flow tuff. Contains quartz and some plagioclase, sanidine, and biotite. About 500 ft thick

Trl YOUNGER RHYOLITIC LAVA (OLIGOCENE)--Generally light-gray, crystal-poor rhyolitic lava domes. Contains quartz and sanidine and generally plagioclase and minor biotite. Zircon fission-track age 25.8±1.2 m.y. old (Erb, 1979). May be as much as 1,000 ft thick

Tps PYROCLASTIC ROCKS AND SANDSTONE (OLIGOCENE)--Air-fall tuff, ash-flow tuff, and tuffaceous sandstone. Locally about 400 ft thick

Tvc VOLCANICLASTIC CONGLOMERATE AND SANDSTONE (OLIGOCENE)--Indistinctly bedded to well-bedded conglomerate and sandstone derived from rhyolitic tuff (Trt), quartz latitic lava and tuff (Tql), volcanic breccia (Tb), and dacitic lava (Td). Locally as much as 500 ft thick

Tb VOLCANIC BRECCIA AND EPICLASTIC SEDIMENTARY BRECCIA (OLIGOCENE)--Largely volcanic breccia similar in composition to quartz latitic tuff of unit Tql and subordinately bedded and unbedded sedimentary breccia derived from the volcanic breccia. Unit locally also includes mudflow and sedimentary breccia derived from dacitic lava (Td). As much as 1,000 ft thick in Hog Canyon

Tql QUARTZ LATITIC LAVA AND TUFF (OLIGOCENE)--Porphyritic quartz latitic domes, flows, dikes, and tuffs. Contains plagioclase and some quartz and hornblende and locally also contains sanidine, biotite, and clinopyroxene. More than 700 ft thick near south end of mapped area

Td DACITIC LAVA (OLIGOCENE)--Porphyritic dacitic lava domes and flows. Contains plagioclase and hornblende and generally contains a little biotite, quartz, and clinopyroxene. About 1,000 ft thick in South Fork Skeleton Canyon

Trt OLDER RHYOLITIC ASH-FLOW TUFF (OLIGOCENE)--Light- to pinkish-gray, crystal-rich to crystal-poor rhyolitic ash-flow tuff. Contains quartz, plagioclase, sanidine, biotite, and rare clinopyroxene. Zircon fission-track age 27.1±1.5 m.y. old (Erb, 1979). About 1,100 ft thick in south part of Bunk Robinson Peak Roadless Area

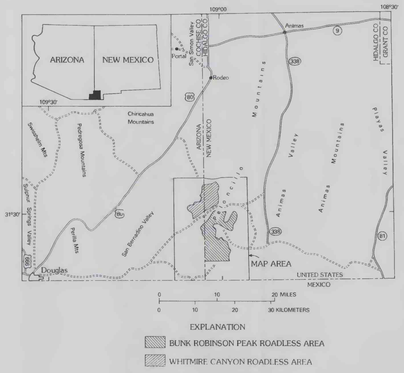
Tro OLDER RHYOLITIC LAVA (OLIGOCENE)--Light-brown to very light gray, crystal-poor rhyolitic lava domes. Contains quartz, sanidine, and rare plagioclase. Found only in Skeleton Canyon. More than 600 ft thick

Kc CINTURA FORMATION (LOWER CRETACEOUS)--Interbedded, yellowish-gray to pale-reddish-brown sandstone, siltstone, and mudstone. Less than 100 ft preserved in mapped area

Kmu MURAL LIMESTONE (LOWER CRETACEOUS)--Light-gray-weathering, medium-gray fossiliferous limestone interbedded with some yellowish-gray sandstone, siltstone, and mudstone. About 300 ft thick

Km MORITA FORMATION (LOWER CRETACEOUS)--Interbedded, yellowish-gray to pale-reddish-brown sandstone, siltstone, and mudstone and minor medium-gray impure limestone. About 700 ft exposed in mapped area

PIPn NACO GROUP (LOWER PERMIAN AND PENNSYLVANIAN)--Medium- to light-gray limestone and medium-gray dolomite and minor pale-red to pale-yellowish-brown siltstone. Comprised mainly of Permian Colina Limestone, Permian and Pennsylvanian Earp Formation, and Pennsylvanian Horquilla Limestone, and possibly some Permian Epitaph Dolomite. About 1,000 ft exposed in mapped area



INDEX MAP SHOWING LOCATION OF BUNK ROBINSON PEAK AND WHITMIRE CANYON ROADLESS AREAS (U.S. FOREST SERVICE AREAS 3-200 AND 3-110, RESPECTIVELY)

CONTACT--Dashed where approximately located

NORMAL FAULT--Bar and ball on downthrown side. Dashed where approximately located; dotted where concealed; queried where hypothetical

THRUST FAULT--Teeth on upper plate

STRIKE AND DIP OF INCLINED BEDS

APPROXIMATE BOUNDARY OF BUNK ROBINSON PEAK ROADLESS AREA AS OF APRIL 9, 1980

APPROXIMATE BOUNDARY OF WHITMIRE CANYON ROADLESS AREA AS OF APRIL 9, 1980

AREA OF ALTERED ROCK THAT HAS POTENTIAL FOR UNDISCOVERED METALLIC DEPOSITS AT DEPTH

AREA OF MOSTLY DOMINANT RHYOLITIC LAVA THAT COULD CONTAIN UNDISCOVERED METALLIC DEPOSITS AT DEPTH

STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral survey of the Bunk Robinson Peak and Whitmire Canyon Roadless Areas in the Coronado National Forest, Hidalgo County, N. Mex., and Cochise County, Ariz. The Bunk Robinson Peak and Whitmire Canyon Roadless Areas (U.S. Forest Service areas 3-200 and 3-110, respectively) were classified as further planning areas during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

The investigations did not reveal any minable mineral deposits near the surface within the boundaries of the roadless areas, but geochemical data and alteration studies indicated possible undiscovered metallic deposits at depth. The most likely area for deposits of molybdenum, lead, and zinc is beneath a hydrothermally altered area in the northwest part of the Bunk Robinson Peak Roadless Area. Volcanic vent areas or buried igneous stocks in the southwest part of the Whitmire Canyon Roadless Area and the northeast part of the Bunk Robinson Peak Roadless Area also offer moderate potential for undiscovered metallic deposits at depth. There may also be a moderate potential for perlite deposits within the roadless areas, but there seems to be very low potential for other nonmetalliferous deposits or for oil or gas.

INTRODUCTION

During the spring and fall of 1980, the U.S. Geological Survey and the U.S. Bureau of Mines conducted a mineral resource appraisal of the Bunk Robinson Peak and the Whitmire Canyon Roadless Areas. The roadless areas lie in Coronado National Forest and straddle the Arizona-New Mexico state line in the southern Peloncillo Mountains. They are separated by a mile-wide zone containing a road (the Geronimo Trail) that crosses the mountains.

GEOLOGIC SETTING

The Peloncillo Mountains, in which the Bunk Robinson Peak and the Whitmire Canyon Roadless Areas lie, were probably elevated to their present position by mid- to late Tertiary basin and range-type faulting. About 80 percent of the outcropping rock in the two roadless areas is rhyolitic tuff and lava of Oligocene age, the tuff being dominant in the Bunk Robinson Peak Roadless Area and lava being dominant in the Whitmire Canyon Roadless Area. Other rocks in the two roadless areas consist of dacitic lava, quartz latitic lava and tuff, volcanic breccias, and diverse epiclastic rocks all also of Oligocene age. Some tuffaceous sandstone and conglomerate containing interlayered tuff of probable Miocene age lies near the northeast corners of both roadless areas, and small remnants of Pleistocene or Pliocene olivine basaltic lava cap some higher hills in both roadless areas.

GEOCHEMISTRY

Results of the geochemical investigations of this study (Watts and others, 1983) do not directly indicate the presence of any important mineral deposits, but anomalous values of a half dozen elements in three general areas are noteworthy. An area of altered (kaolinized?) rock near the Silvertip mine that extends into the Bunk Robinson Peak Roadless Area was found to contain higher than normal values of barium, lead, and arsenic. In addition, spring water in this altered area was found to be very acidic and to contain anomalous amounts of aluminum, sulfate, manganese, iron, molybdenum, and zinc. A large area underlain by rhyolitic lava, that covers much of the Whitmire Canyon Roadless Area and several square miles in the northeast part of the Bunk Robinson Peak Roadless Area, shows anomalously high values of tin, related to the visually identified mineral cassiterite (SnO_2), in heavy mineral concentrates of stream-sediment samples. Molybdenum shows higher than normal values in much of the area covered by rhyolitic lava, and beryllium, bismuth, lead, and zinc are locally abnormally abundant within the rhyolitic lava. An arcuate area near the Baker Canyon fault, west of the Bunk Robinson Peak Roadless Area, showed higher than normal values of tin, beryllium, and barium. All of the above, if not directly indicative of potential mineral deposits, add to the surface geologic evidence for a buried igneous stock or a metallized volcanic cauldron being centered in the mapped area and having genetic affinities to tin-molybdenum mineralization. As suggested by Elston (1978), many of the mining districts of southwestern New Mexico seem to be directly related to volcanic cauldrons of mid-Tertiary age.

MINING ACTIVITY

No mining activity was conducted in or near the Bunk Robinson Peak and Whitmire Canyon Roadless Areas during the time of our study, but there has been some recent prospecting. During the spring of 1980, an exploration firm, under contract from a petroleum company, was doing geophysical work near the roadless areas.

A search of courthouse records revealed that about 90 mining claims, most of them near the Silvertip mine, had been staked in the mapped area. The Silvertip mine, 1/3 mi outside the northwest boundary of the Bunk Robinson Peak Roadless Area, consists of a 240-ft-long adit and a 30-ft-deep shaft in a 10-ft-thick mineralized fracture zone (S. D. Brown, unpub. data, 1980). The mine dumps contain about 80 tons of rock though no ore minerals were recognized. No mining records could be found for the Silvertip mine, suggesting that if there ever was precious metal production it probably was not substantial.

A small abandoned rock quarry lies between the roadless areas; the rock quarried was rhyolite tuff that was used locally for building stone.

About 9 mi^2 of each of the roadless areas have been leased for oil and gas exploration. In addition, oil- and gas-lease applications are pending for about 20 mi^2 in the Bunk Robinson Peak Roadless Area and for about 7 mi^2 in the Whitmire Canyon Roadless Area.

MISCELLANEOUS FIELD STUDIES
MAP MF-1425-B
PAMPHLET ACCOMPANIES MAP

ASSESSMENT OF MINERAL RESOURCE POTENTIAL

Base and precious metals

There are no direct indications of deposits containing base or precious metals in the Bunk Robinson Peak or Whitmire Canyon Roadless Areas. However, kaolinized(?) surface rock, metal-rich acid waters, and anomalously high values of barium, lead, molybdenum, and arsenic in an area that extends into the Bunk Robinson Peak Roadless Area from the vicinity of the Silvertip mine, indicate mineralizing hydrothermal activity occurred in that area. Consequently, it is possible that mineral deposits containing molybdenum, bismuth, lead, zinc, or possibly precious metals could be discovered in the subsurface of the Bunk Robinson Peak Roadless Area by drilling. Similar altered rock, acid waters, and anomalously high values of barium near the Baker Canyon fault, which is just west of the southern part of the Bunk Robinson Peak Roadless Area, indicate hydrothermal activity occurred there, too. Anomalously high values of tin, molybdenum, beryllium, and bismuth in areas underlain by rhyolitic lava in both roadless areas are not indicative of mineral deposits at the surface, but do suggest the possibility of the presence of mineralized igneous rock at depth.

Nonmetalliferous deposits

No important nonmetalliferous deposits were found within the Bunk Robinson Peak or the Whitmire Canyon Roadless Areas. However, layers of obsidian as much as 8 ft thick are present locally in the rhyolitic lava outcrops in both roadless areas. The presence of obsidian suggests that the roadless areas could also contain potential perlite resources. Rhyolite tuff between the roadless areas has been quarried for building stone for local house construction.

Oil and gas

Sedimentary rocks of Paleozoic and Cretaceous ages that could conceivably contain hydrocarbon reservoirs may underlie the Bunk Robinson Peak and the Whitmire Canyon Roadless Areas at depth (Thompson and others, 1978). Sam Thompson III (written commun., July 19, 1982) reports that natural gas in Permian rocks and dead oil in Ordovician rocks have been encountered in exploratory holes drilled about 30 mi east of the roadless areas. However, the volcanic activity that was located in or near the roadless areas would almost certainly have had a deleterious effect on any oil or gas that may once have been present beneath the roadless areas. For that reason, the oil and gas potential of the roadless areas is considered low.

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